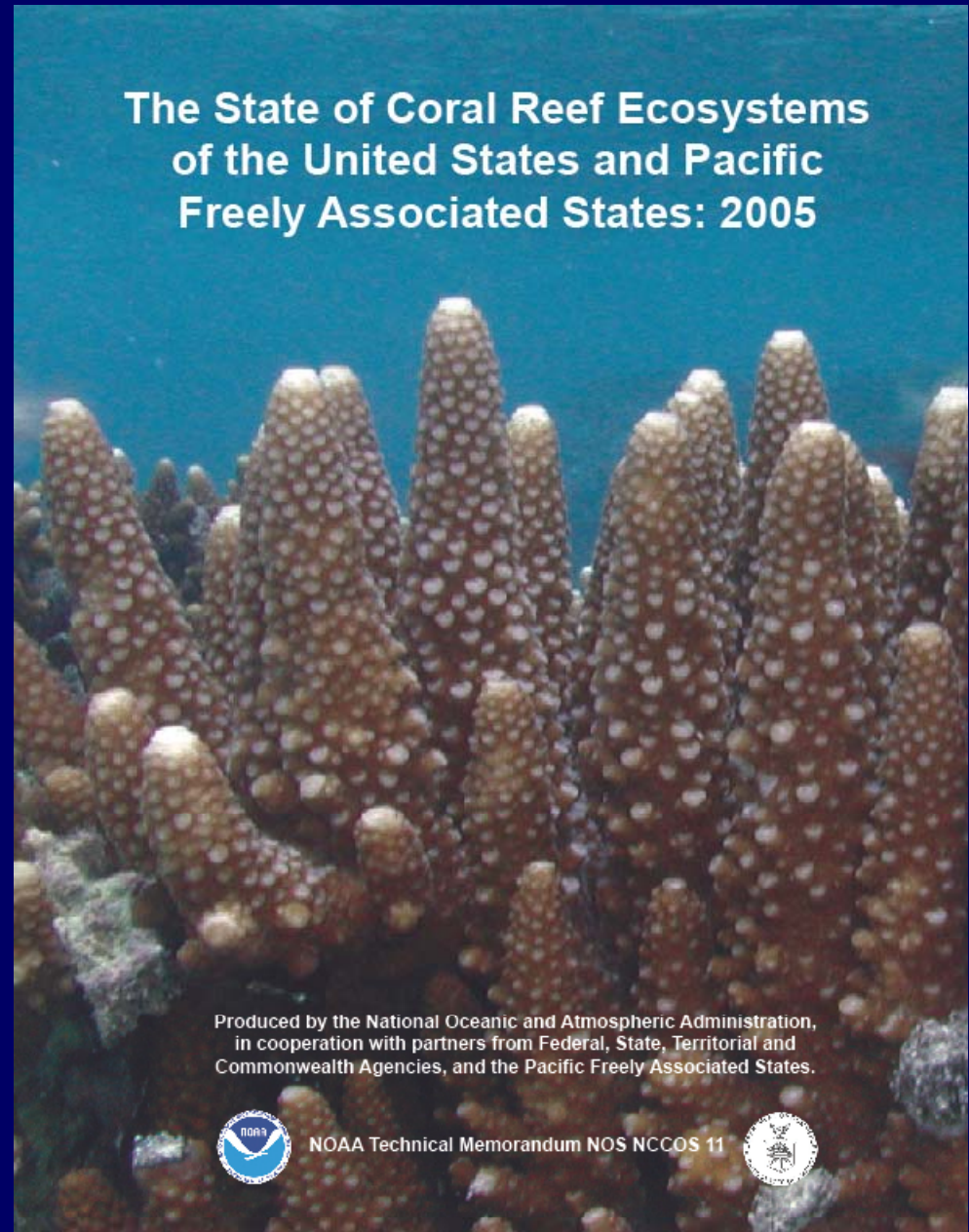


# *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005*

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NOAA's  
Coral Reef Conservation Program  
<http://www.coralreef.noaa.gov>



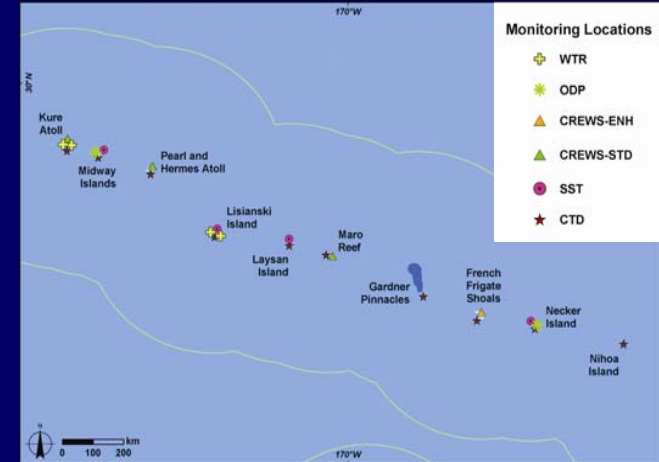
# State of U.S. Coral Reef Ecosystems 2005

## What the report is:

- First use of spatially-explicit quantitative monitoring data to assess condition of U.S. coral reef ecosystems
- Product of broad collaboration among Federal, State/Territory, academic, & private partners
- Integrated product of developing coral reef observing system

## Why the report is important:

- Tool for increasing management effectiveness
- Advances integration and coordination of reef monitoring efforts
- Promotes coral reef observing systems



Oceanographic buoy locations in the Northwestern Hawaiian Islands



Scientists monitor fish and benthic habitats in the U.S. Virgin Islands

# Key Messages from the Report

## What the report provides:

- Inventory of monitoring programs by jurisdiction
- Summarized results of monitoring efforts
- Descriptions of threats to reef ecosystems
- Recommendations for future research, monitoring, and management activities
- National summary
- Information gaps
- Standardized GIS maps

## What the report doesn't provide:

- A quantitative national-level assessment comparable across jurisdictions
- Complete integration of monitoring data
- Direct cause and effect relationships between stressors and resource condition
- Comprehensive comparison of historical data to current reef ecosystem condition



Monitoring locations in Palau



Photo: J. Maragos

A crown-of-thorns sea star





# Links to National Priorities

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## Supports U.S. National Coral Reef Action Plan goals:

- Document the status of U.S. reef ecosystems
- Build comprehensive coral reef monitoring network

## Supports U.S. Ocean Action Plan goals:

- Increase collaboration among Federal, state/territory and other partners
- Promote integration of monitoring efforts into observing systems (e.g., IOOS, GEOSS)
- Assist management efforts (e.g., Local Action Strategies)
- Increase public understanding of coral reef ecosystem issues
- Demonstrate U.S. leadership in ocean issues



Photo: J. Maragos

*Tubastrea coccinea* is native to the Pacific, but it has recently been found growing on oil and gas platforms in the Gulf of Mexico.

# Report Contents and Objectives

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- Second nationwide assessment of the condition of coral reef ecosystems
- Addresses requirements outlined in *National Coral Reef Action Strategy* & the Coral Reef Conservation Act of 2000
- 14 jurisdiction chapters authored by expert writing teams in each location (160 contributors)
- Attempts to quantitatively define status of coral reef ecosystem condition
- Demonstrates capacity building to improve monitoring capabilities
- Provides standardized GIS maps of coral reef ecosystems

## 2005 Report Outline

Preface

Executive Summary

Introduction

Threats and Stressors

14 Jurisdiction Chapters

Introduction

Threats

Monitoring Activities

- Water Quality

- Benthic Habitats

- Biological Communities

Current Management

Conclusions & Recommendations

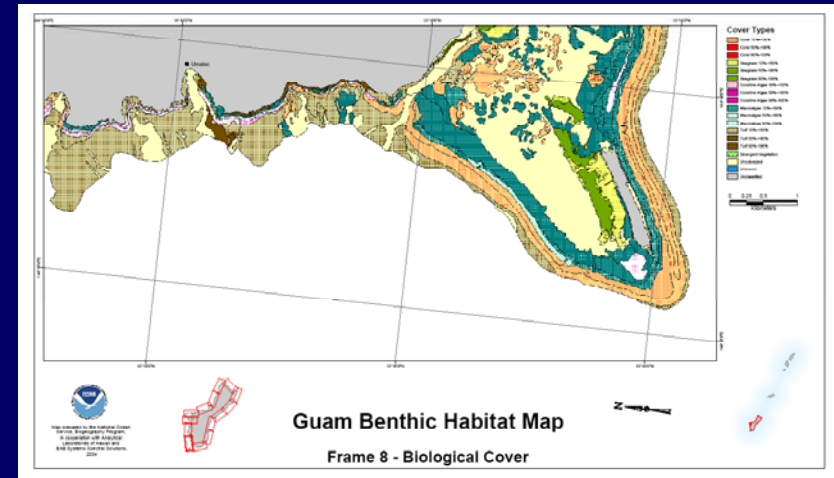
National Summary



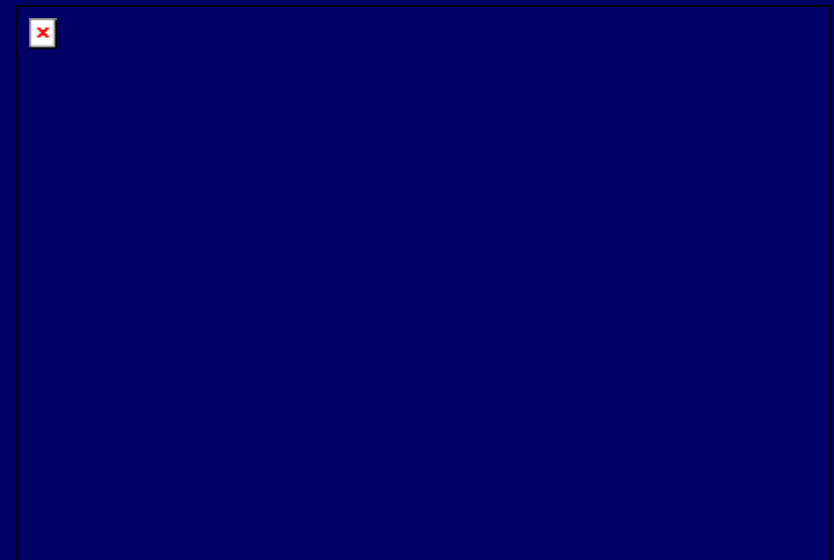
# Mapping Coral Reef Ecosystems

Digital shallow water bottom habitat maps are now available for the U.S. Virgin Islands, Puerto Rico, Main Hawaiian Islands, Northwestern Hawaiian Islands, American Samoa, Guam, and CNMI.

High-resolution multibeam (sonar) bathymetry data has been collected in moderate depths for portions of several jurisdictions.



Benthic habitats of Cocos Lagoon, Guam



Multibeam bathymetry from American Samoa



# Report Conclusions—National Summary

- National Summary table presents the relative level of 'perceived threat' for each jurisdiction in 2002 and 2004

- Changes in perceived threat value are presented for each threat and jurisdiction

- Information is based on the expert opinion of writing teams in each jurisdiction

		Climate change & coral bleaching	Diseases	Tropical storms	Coastal development and runoff	Coastal pollution	Tourism and recreation	Fishing	Trade in coral and live reef species	Ships, boats, and groundings	Marine debris	Aquatic invasive species	Security training activities	Offshore oil and gas exploration	Other	Jurisdictional Composite	Trend	
CNMI	2002	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	14	<div></div>	
	2004	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9		
Guam	2002	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	8	<div></div>	
	2004	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	13		
Palau	2002	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	11	<div></div>	
	2004	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	6		
Stressor Change Assessment		2002	12	6	7	19	17	9	18	9	17	10	10	5	1	8		
		2004	16	7	8	18	11	9	20	5	13	7	5	2	1	4		
Δ (2002 to 2004)		<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	-	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	-	<div></div>		
Temporal Composite Threat		<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>		

Yellow = minor threat;  
Orange = medium threat;  
Red = significant threat

# Report Conclusions—National Summary

Key parameters monitored in each jurisdiction.

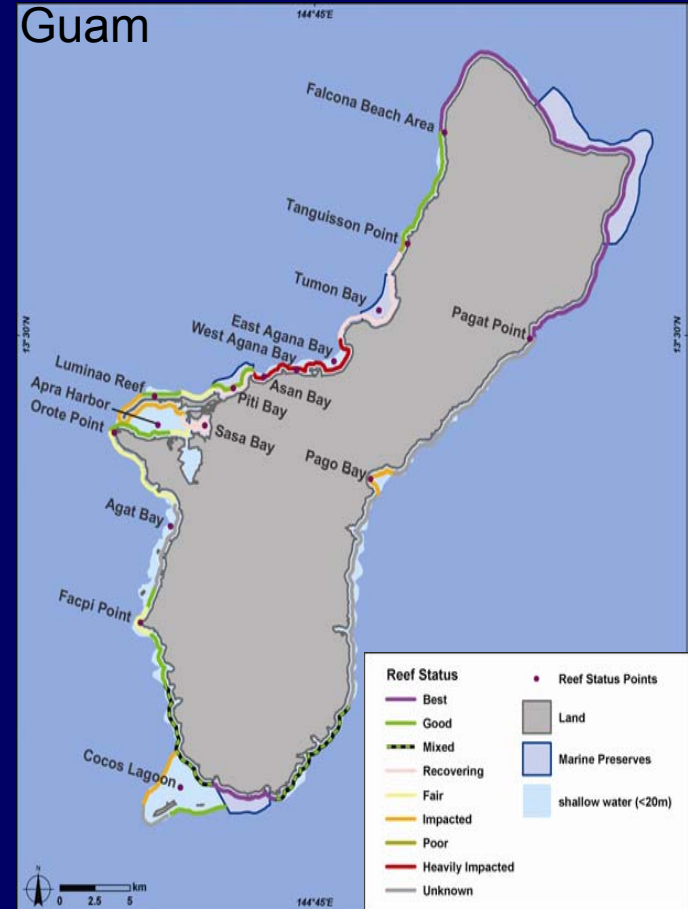
	WATER QUALITY					BENTHOS					ASSOCIATED BIOTA				
	Turbidity	DO	Chlorophyll	Nutrients	Bacteria	Live coral % cover	Coral recruitment	Algal % cover	Coral disease	Coral bleaching	Fish abundance	Commercially important fish	Ecologically important macroinvertebrates	Commercially important macroinvertebrates	Protected species
USVI	●	●		●	●	●	●	●	●	●	●	●	●	●	●
Puerto Rico	●	●		●	●	●		●	●	●	●	●	●	●	
Navassa				●		●	●	●	●	●	●	●	●	●	●
Florida	●	●	●	●		●	●	●	●	●	●	●	●	●	●
Flower Gardens NMS	●	●	●	●		●		●	●	●	●	●	●	●	●
Main Hawaiian Islands	●	●	●	●	●	●		●	●	●	●	●	●	●	●
Northwestern Hawaiian Islands	●	●	●			●	●	●	●	●	●	●	●	●	●
American Samoa	●	●	●	●	●	●		●	●	●	●	●	●	●	●
Pacific Remote Island Areas	●	●	●			●	●	●	●	●	●	●	●		●
Marshall Islands						●		●	●	●	●	●	●	●	●
Federated States of Micronesia	●	●			●	●		●			●	●	●	●	
Northern Mariana Islands	●	●	●	●	●	●		●	●	●	●	●	●	●	●
Guam	●	●		●	●	●	●	●		●	●	●	●	●	●
Palau	●	●			●	●	●	●	●	●	●	●			





# Report Conclusions—General Results

- Coral reef ecosystem condition varies within and among jurisdictions
- Differences in monitoring techniques prevent cross jurisdictional comparisons
- Some threats intensifying while others are decreasing. Key threats include: over-fishing, land-based pollution, diseases, storms, vessel groundings
- Reefs near population centers and industrial areas generally have greater impacts from fishing pressure, sedimentation, recreational use, and land-based pollution
- Quantitative data available for many metrics of coral ecosystem condition
- More tools available for effective management (e.g., digital habitat maps)
- Moving towards development of a national coral ecosystem monitoring network



# Report Conclusions—Specific Results

Monitoring programs most frequently target:

- seafloor community composition,
- coral cover & diversity,
- prevalence of disease,
- fish abundance.

Coral reef protected areas contribute to increased fish biomass and abundance.

Example jurisdictional results:

- In much of the U.S. Caribbean and parts of Florida, ‘coral rubble overgrown with algae’ now represents the dominant habitat in areas formerly dominated by live corals.
- The uninhabited Northwestern Hawaiian Islands and Pacific Remote Islands support robust fish communities.
- Fish assemblages near populated areas are often far less abundant with few large fish and apex predators.
- Alien algae have proliferated on many Hawaiian reefs and pose a significant threat to Hawaii’s unique native marine biodiversity.
- Over 350 mooring buoys protect reefs from anchors in USVI.



## For More Information

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Digital (Adobe PDF) files of the entire report and individual chapters are available at:



Photo: Roland

[http://ccma.nos.noaa.gov/ecosystems/coralreef/coral\\_report\\_2005](http://ccma.nos.noaa.gov/ecosystems/coralreef/coral_report_2005)

